

**Notice of Allowability**

Application No.

10/687,127

Examiner

Ida M. Soward

Applicant(s)

KIM ET AL.

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Applicants' amendment filed January 17, 2006.
2. ☒ The allowed claim(s) is/are 11-15, 17-22 and 24-36.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

*Ida M. Soward*  
ALL 2822

### **DETAILED ACTION**

This Office Action is in response to the Applicants' amendment filed January 17, 2006.

### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Timothy N. Trop on April 3, 2006.

The application has been amended as follows:

Claim 22 (Currently Amended). A packaged integrated circuit structure comprising:

a stack including a pair of integrated circuit chips, a first cooling integrated circuit chip between said pair of integrated circuit chips, a second cooling integrated circuit chip on one of said integrated circuit chips; said first and second cooling integrated circuit chips including microchannels for the circulation of a cooling fluid;

a package receiving said stack, said package having formed therein an inlet fluid reservoir and an outlet fluid reservoir to communicate with said microchannels; and

a path to recycle fluid from said outlet fluid reservoir to said inlet fluid reservoir.

Art Unit: 2822

Claim 32 (Currently Amended). A packaged integrated circuit structure comprising:

- a pair of heat generating integrated circuit chips including temperature sensors within said integrated circuit chips;

- a cooling integrated circuit chip between said pair of heat generating integrated circuit chips, said cooling integrated circuit chip including microchannels for the circulation of a cooling fluid;

- a package containing said integrated circuit chips; and

- a controller; and

- electroosmotic pumps, said temperature sensors to selectively operate said electroosmotic pumps to cool particular regions of said heat generating integrated circuit chips.

Claims 1-10, non-elected without traverse, have been canceled.

### ***Allowable Subject Matter***

Claims 11-15, 17-22 and 24-36 are allowed.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to packaged integrated circuit structures:

Akamatsu (5,264,984)	Barrett et al. (4,536,824)
Bjorndahl et al. (6,005,771)	Chu et al. (5,168,348)
Chu et al. (US 2003/0122245 A1)	Ikeda (5,436,501)
Kieda et al. (5,021,924)	Ostergren et al. (4,639,829)
Sherif et al. (5,724,729)	Shmunis (5,166,863)
Umezawa et al. (5,023,695)	Yokouchi et al. (4,704,658).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M. Soward whose telephone number is 571-272-1845. The examiner can normally be reached on Monday - Thursday 6:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra V. Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/687,127  
Art Unit: 2822

Page 5

IMS  
April 2, 2006

*John M. Sowers*  
*AU 2822*